MEL. T. COOK
AGRI. EXP. STATION
NEW BRUNSWICK, N. J.

# REPORT

OF THE

# Department of Plant Pathology

OF THE

# New Jersey Agricultural College Experiment Station

New Brunswick, N. J.

BY

MELVILLE T. COOK, PH.D.

FOR THE YEAR ENDING

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# REPORT OF THE DEPARTMENT OF PLANT PATHOLOGY

# Department of Plant Pathology

MELVILLE T. COOK, PH.D., *Plant Pathologist.*

*WILLIAM H. MARTIN, A.B., *Research Assistant.*

†ROBERT F. POOLE, B.SC., *Research Assistant.*

*Resigned January 15, 1918, to enter military service.
†Resigned November 15, 1917, to enter military srevice.

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# Report of the Department of Plant Pathology

M. T. Cook

## ORGANIZATION

The organization has been very much changed since our last report. Mr. C. M. Haenseler, who held the New Jersey Zinc Company fellowship, was called to the colors in September and is now in France with a regiment of Forestry Engineers. Mr. R. F. Poole, who came to us from Clemson College, S. C., May 1, 1917, as fellow and assistant, enlisted in November and is in France as photographer in the Aviation Corps; Mr. W. H. Martin, fellow and assistant, completed his work for the Ph. D. degree in January and enlisted in the Aviation Corps; Mr. F. P. Schlatter, who was doing minor work in the department, is in the photographic division of the Aviation Corps; Mr. C. A. Schwarze, State Nursery Inspector, resigned June 1, 1918.

This left the department without help, but fortunately the Office of Cotton, Truck and Forage Crop Disease Investigations, of the United States Department of Agriculture, assigned Dr. L. M. Massey to us for extension work in plant pathology. He had his undergraduate training at Wabash College, from which he was graduated in 1912, and took his Ph. D. degree at Cornell in 1916. Mr. Erdman West has been employed by the State Department of Agriculture as assistant nursery inspector, beginning work June 1, and is stationed here. He was graduated from the Pennsylvania State College in 1917.

## 1918 WORK

Because of war conditions we are planning to do less research than usual and to give more time to the immedate needs for food production. Dr. Massey will give special attention to tomatoes, peppers and sweet potatoes, but will respond to calls for advice and assistance in the control of plant diseases in general throughout the season. The demands for his time are already greater than can be met.

## RESEARCHES

1. The research work on fungi injurious to paint must necessarily be discontinued for the present. The future for this work was very promising at the time Mr. Haenseler was called away.

2. The research on the disease of celery must also be dropped for the present. This is a very promising line of work and should be continued as soon as possible. The work to date demonstrates (a) that seed-bed treatment is very important and profitable, (b) that crop rotation is advantageous, (c) that we should have more data covering soil treatments with fertilizers and other chemicals in the field, and (d) that spraying is profitable when well done.

3. The tomato spraying work will be continued on the farm of the Campbell Soup Company at Riverton, N. J., by the Office of Cotton, Truck and Forage Crop Disease Investigations of the United States Department of Agriculture; this office cooperating.

4. The studies on the transmission of potato diseases through seed tubers is being continued on the College Farm.

5. The potato spraying work also is being continued.

6. Because of the number of complaints in 1917 concerning a bacterial corn disease, we will make tests in cooperation with Prof. bacterial corn disease, we will make tests in cooperation with Dr. G. N. Hoffer, of the Indian Agricultural Experimental Station, who has been studying this problem for some time.

## SEED-BED DISEASES

During the spring of 1918 we had more complaints than usual concerning *damping-off* in seed-beds. Losses of this kind cannot be estimated with accuracy but were no doubt much greater than is generally supposed even by those who are familiar with the facts. They undoubtedly resulted in delays in planting and reduced acreage of certain crops.

There are several organisms which cause *damping-off* in the seed-bed and some of them continue to thrive and cause losses in the field. This is especially true of *Sclerotinia Libertiana* which attacks lettuce, celery, beans, cucumbers and many other plants.

These troubles can be controlled very readily and at a very slight expense. It is one of the most profitable propositions for the vegetable grower. Unfortunately, the loss of men during the year made it impossible for us to take up this work. It should be taken up as an extension project before the time for making seed-beds for another year.

## DISEASE-RESISTANT PLANTS

There is an increasing amount of evidence to show that certain types of plants can be controlled to the best advantage by the development of resistant strains or varieties. This is especially true of those disease, in which the casual organism works within the host and therefore cannot be reached by sprays or other external treatment. Results throughout this country show that it is possible practically to eliminate many diseases in this manner. However, the results also show that resistant strains which are satisfactory for one section of the country may be neither resistant nor satisfactory in another section. It is the opinion of the writer that one of the most important and profitable lines of work for New Jersey would be a series of experiments for the purpose of developing resistant varieties. The most urgent problems of this kind at the present time are with tomatoes, cabbage, celery and alfalfa.

## NEEDS

The most important demands for special studies at this time are as follows:

1. Studies on pathogenic organism in the soil and the best methods for their control. This involves the problem of seed-bed sterilization referred to above.
2. Studies for the development of varieties of crop plants resistant to diseases, especially for those diseases for which there is no other known method of control.
3. Studies on potato diseases for the purpose of determining (a) the extent to which certain diseases are carried in or on the tubers, (b) the extent to which diseases are eliminated by the growing of very late crops to be used as seed the following year, and (c) the extent to which the foliage diseases can be controlled with profit by spraying.
4. Studies of the *mosaic* and other diseases of the tomato.
5. Studies on the wilt of eggplant.
6. Studies on the diseases of celery.
7. Studies on the diseases of legumes, especially alfalfa.
8. Studies on the diseases of shade and ornamental plants.
9. The importance of plant disease organisms as destroyers of perishable products in storage and during shipment is attracting a great deal of attention at this time and some steps should be taken to bring the facts before our New Jersey producers and to pursue studies along this line.

### The Herbarium

Unfortunately our herbarium has been neglected for several years. The mounted plants should be gone over carefully and arranged in accordance with the up-to-date researches in taxonomy. Several hundred unmounted plants should be mounted and properly distributed so that they can be used to advantage.

## PUBLICATIONS

The following publications have been issued November, 1917.

Circular 88. Common diseases of berries. Mel. T. Cook.
Circular 89. Common diseases of garden vegetables and truck crops. Mel. T. Cook.
Circular 93. Spray calendar for apples and quinces. T. J. Headlee, M. T. Cook, M. A. Blake and A. J. Farley.
Circular 94. Spray calendar for the peach. T. J. Headlee, M. T. Cook, M. O. Blake, and A. J. Farley.
Circular 95. Seed and soil treatment for the control of potato scab. H. Clay Lint.
Circular 96. Leaf blight of the tomato. Mel. T. Cook and W. H. Martin.
Circular 97. Common diseases of ornamental plants. Mel. T. Cook.
Martin, G. W., 1918. Brown blotch of the Keiffer pear, *Phytopathology*, v. 8, p. 234-240.

## LIST OF PLANT DISEASES

Having published a list of the plant diseases of 1917 in our last report we have very few to add at this time. We consider it advisable to withhold this brief list and incorporate it in the next annual report.

## PLANT DISEASE SURVEY

The United States Bureau of Plant Industry has established a Plant Disease Survey which is being conducted in cooperation with the departments in the different states. This work of the department is of the greatest importance, especially at this time. Had much of the information which we are now gathering been available at the beginning of the war, it would have been an important factor in the food production of our country.